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Docket # 4907

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

1772  
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Re Application of

JEAN-PIERRE TAHON ET AL

U.S. Serial No. 09/689,632

Group Art Unit 1772

Filed: October 13, 2000

Examiner: S. Hon

LIQUID CRYSTAL ALIGNMENT LAYER

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Dear Sir:

Transmitted herewith is ~~an amendment~~ / a response in the above-identified application.

  X   No additional fee is required.  
      An additional fee is required as calculated below -

	Claims Remaining After Amendment	Highest No. Previously Paid For	Present Extra		Small Entity Add'l Rate Fee		Other Than A Small Entity Add'l Rate Fee
Total	<u>      </u>	Minus * <u>      </u>	<u>      </u>	x	\$ 9 \$ <u>      </u>	x	\$18 \$ <u>      </u>
Indep	<u>      </u>	Minus * <u>      </u>	<u>      </u>	x	\$43 \$ <u>      </u>	x	\$86 \$ <u>      </u>
First Presentation of Mul Dep Claim.....				x	\$145 \$ <u>      </u>	x	\$290 \$ <u>      </u>
Total Additional Fee.....					\$ <u>      </u>	.....	\$ <u>      </u>

\* The "Highest Number Previously Paid For" (Total or Independent) is the highest number of claims filed originally or highest number found from equivalent box of a prior amendment.

      This response is being filed within the period for response.

  X   Applicant(s) hereby petition for an extension from the date of the Examiner's Action as follows:

      First-Month Extension..... \$ 55.00 / \$ 110.00  
  X   Second-Month Extension..... \$ ~~210.00~~ / \$ 420.00  
      Third-Month Extension..... \$ 475.00 / \$ 950.00

      Small entity status of this application has been established.

A Check in the amount of \$ 420.00 is attached hereto. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-3690 of the undersigned attorney. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

By Wang Breiner  
Attorney of Record, Reg. No. 33,161

Date: March 22, 2004  
(703) 684-6885

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"PATENT APPLICATION"

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

JEAN-PIERRE TAHON ET AL

U.S. Serial No. 09/689,632

Group Art Unit 1772

Filed: October 13, 2000

S. Hon, Examiner

LIQUID CRYSTAL ALIGNMENT LAYER

Alexandria, Virginia  
March 22, 2004

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

R E S P O N S E

Dear Sir:

This is in response to the official action mailed October 22, 2003. Applicants have considered the outstanding official action. Applicants submit that the claims are directed to patentable subject matter as set forth below. Full and favorable consideration of the present response is requested.

Initially, as to claims 8 and 17, the Examiner advises that should claim 8 be found allowable that claim 17 would be objected to as being a substantial duplicate thereof. It is noted that claim 8 is directed to a liquid crystal device whereas claim 17 is directed to a liquid crystal display including a liquid crystal device such as in claim 8. Applicants can include claims providing for a

range of protection. Accordingly, it is submitted that claims 8 and 17 are both properly in the application.

Additionally, before analyzing the prior art in detail, it is first noted that none of the prior art relied upon teaches every element of the claimed invention and, accordingly, there is no anticipation within the meaning of 35 U.S.C. §102. Realizing this, the Examiner relies on 35 U.S.C. §103. Accordingly, since none of the references teach all of the elements of the claims, it is necessary that there be some basis in the references which would cause one skilled in the art to combine the particular teachings to come up with the claimed invention. In the present instance, applicants submit that there is simply nothing in the applied art which would lead one skilled in the art to conclude that a method of making a liquid crystal alignment layer and a liquid crystal alignment layer could be obtained as in the present invention.

Applicants submit that it is clear that the burden of establishing a prima facie case of obviousness requires a showing of some objective teaching in the prior art or from knowledge generally available to one of ordinary skill in the art that would lead that individual to combine the relevant teachings of the references. Ex parte Levengood, 28 USPQ 2d 1300, 1302 (BPAI 1993). An Examiner cannot establish obviousness by locating references which describe

various aspects of a patent applicant's invention without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done. Ex parte Levengood, supra, at 1302. It is now well settled that a rejection under 35 U.S.C. §103 must rest on a firm factual basis and that the Examiner has the initial duty of providing that factual basis. Deficiencies in the factual basis cannot be supplied by resorting to speculation or unsupported generalities. In re Warner, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967) and In re Freed, 425 F.2d 785, 165 USPQ 570 (CCPA 1970).

Further, the mere fact that the prior art can be modified does not make the modification obvious unless the prior art suggests the desirability of the modification. In re Gordon, 733 F.2d 900, 902; 221 USPQ 1125 (Fed. Cir. 1984). Once applicants' solution to a problem is disclosed, it is easy to see how prior art references can be modified and manipulated to produce the claimed invention. The change can appear simple and by hindsight seem obvious. However, as stated by the Court in In re Sporck, 133 USPQ 360, 363 (CCPA 1962), the simplicity of new inventions is oftentimes the very thing that is not obvious before they are made.

Applicants submit that the Examiner has not established a prima facie case of obviousness in the present application as set forth in detail hereafter.

The outstanding rejections based on art are as follows:

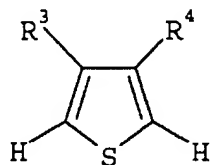
- (1) Claims 4-5, 7-10 and 14 under 35 U.S.C. §103(a) over U.S. Patent No. 5,118,538 (Escher) in view of U.S. Patent No. 5,286,414 (Kämpf);
- (2) Claims 11-12 under 35 U.S.C. §103(a) over Escher in view of Kämpf as applied above and further in view of U.S. Patent No. 5,465,169 (Eguchi); and
- (3) Claim 17 under 35 U.S.C. §103(a) over Escher in view of Kämpf.

Claims 4, 8, 12, 14 and 17 are the pending independent claims. Claims 5, 7 and 9-11 are dependent claims.

The primary reference Escher does not disclose polythiophenes according to applicants' claimed formula (I) in which  $R^1$  and  $R^2$  together form an O-[C<sub>1</sub>-C<sub>4</sub> alkylene]-O group or an O-[cycloalkylene]-O group. Escher discloses at column 4, lines 47-61, that owing to its good orienting properties (good planar orientation) and its high electrical conductivity, the use of a polymer of the formula (III) [poly(3-methoxythiophene) with a degree of polymerization of 5 or 6 and BF<sub>4</sub><sup>-</sup> counterions] has proved particularly advantageous for orienting layers in displays. Escher

claims liquid crystal orienting properties for poly(3,4-dialkoxythiophene)s, but provides no enabling support for the possibility that poly(3,4-dialkoxy-thiophene)s or poly(3,4-dialkylenethiophene)s exhibit liquid crystal orienting properties. One skilled in the art would be aware of the fact that chemical species exhibit properties which are extremely dependent upon their chemical structure. Applicants thus submit that Escher does not teach or suggest that poly(3,4-dialkoxy-thiophene)s or poly(3,4-dioxy-alkylenethiophene)s exhibit liquid crystal orienting properties.

Escher also discloses at column 2, lines 12-62, that electrically conductive polymers, which are soluble in oxidized form in dipolar aprotic solvents at room temperature are derived from a monomer of the formula below:



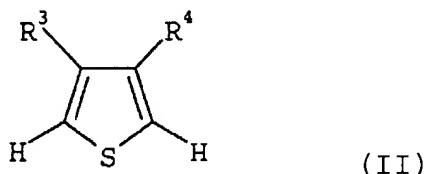
where at least one of the two radicals  $R^3$  and  $R^4$  is an alkoxy group and the other is optionally  $(C_1-C_6)$ alkyl or hydrogen, and that such polymers have already been described in DE-A 3,717,668, DE-A 3,628,895 and DE-A 3,736,114. However, these documents do not teach poly(3,4-dioxyalkylene-thiophene)s. These documents as alluded to in

Escher and Escher only teach polythiophenes substituted at the R<sup>3</sup> and R<sup>4</sup> positions with an alkoxy group, straight-chain or branched alkyl, hydrogen or halogen. These documents as alluded to in Escher and Escher do not teach R<sup>3</sup> and R<sup>4</sup> being alkylene or cycloalkylene attached to an oxygen as in the R<sup>1</sup> and R<sup>2</sup> positions of the -O-R<sup>1</sup> and -O-R<sup>2</sup> positions of the claimed invention. These documents as alluded to in Escher and Escher only disclose that R<sup>3</sup> and R<sup>4</sup> can be alkoxy (-OR), but does not teach R<sup>3</sup> and R<sup>4</sup> as an oxyalkylene. As known in the art, an alkoxy group is an alkyl radical attached to the remainder of the molecule by oxygen and is not an alkylene radical attached to remainder of the molecule by oxygen. [See definition of "alkoxy", Hackh's Chemical Dictionary, 4th Ed., page 27 (1969)]. Furthermore, Escher provides no suggestion or indication that polythiophenes, other than those disclosed, could also exhibit similar properties.

The Examiner refers to DE-A 3,717,668, DE-A 3,628,895 and DE-A 3,736,114 as providing a disclosure of poly(3,4-alkylenedioxythiophene). However, none of these German applications were incorporated by reference into Escher. Nonetheless, these documents, as detailed in Escher and described above, do not teach or suggest the claimed invention. Applicants thus submit that Escher does not teach or suggest poly(3,4-dioxyalkylenethiophene).

Kämpf is relied on by the Examiner on the basis of it being the U.S. equivalent of DE-A 3,717,668 and having been cited in Escher at column 2, lines 34-52 as follows:

"Electrically conductive polymers, which are soluble in oxidized form in dipolar aprotic solvents at room temperature and which are derived from a monomer of the formula (II)



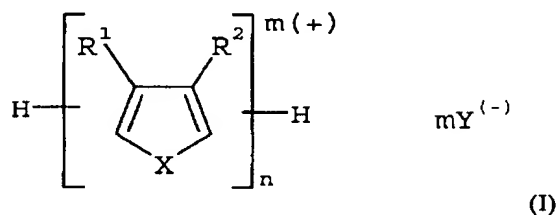
where at least one of the two radicals R<sup>3</sup> and R<sup>4</sup> is an alkoxy group and the other is optionally (C<sub>1</sub>-C<sub>6</sub>) alkyl or hydrogen, have already been described in DE-A 3,717,668, DE-A 3,628,895 and DE-A 3,736,114. The preparation, the stability and electrical conductivity of the various, positively doped polymers were also investigated therein."

This passage refers to polymers derived from monomers of formula (II). One skilled in the art would regard such polymers as a preferred embodiment of the polymers of formula (I). This is not inconsistent with being an alternate as asserted by the Examiner. The polymers of formula (II) are further defined polymers within the scope



of formula (I). Since formula (II) is within the teaching of formula (I),  $R^3$  and  $R^4$  in formula (II) must correspond to  $R^1$  and  $R^2$  in formula (I), i.e. -

"... an electrically conductive polymer which is composed of repetitive units of the formula (I):



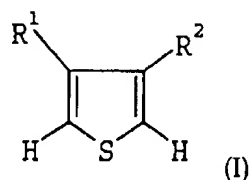
where  $R^1$ ,  $R^2$  are independently of each other, H, or straight-chain or branched alkyl or alkoxy containing 1-16 carbon atoms, or halogen, ... ."

The options for  $R^1$  and  $R^2$  in formula (II) therefore are within the definition for formula (I) and any implication to be drawn by one skilled in the art from the reference to DE-A 3,717,668, DE-A 3,628,895 and DE-A 3,736,114 with respect to formula (II) must be limited to being within the definition for  $R^1$  and  $R^2$  in formula (I). Such definitions do not include poly(3,4-dioxyalkylene-thiophene)s.

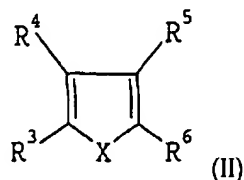
Additionally, these German applications are not incorporated by reference into Kämpf. Specifically, just because the Examiner states that Kämpf is the U.S. equivalent of DE-A 3,717,668, DE-A 3,717,668 is not automatically incorporated by reference into Kämpf. Applicants therefore respectfully

traverse any assertion that the full disclosure of DE-A 3,717,668, DE-A 3,628,895 and DE-A 3,736,114 with regard to the definition of  $R^1$  and  $R^2$  in formula (I) can be incorporated into Escher as applied by the Examiner to broaden the disclosure of Kämpf.

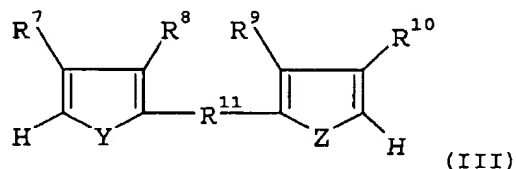
Kämpf discloses an electroconductive coating composition comprising 10 to 100% by weight of an oligomer having three to ten structural units which are connected to one another by a linkage in the two-position and/or five-position, on statistical average comprising 60 to 100% by weight of structural units derived from at least one monomer of the formula (I)



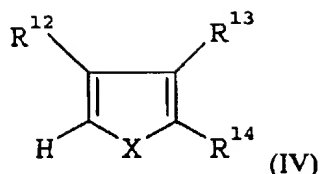
in which  $R^1$  denotes a  $C_1$ - $C_{12}$  alkoxy group or  $-O(CH_2CH_2O)_nCH_3$  where  $n=1$  to 4 and  $R^2$  denotes a hydrogen atom, a  $C_1$ - $C_{12}$  alkyl group, a  $C_1$ - $C_{12}$ -alkoxy group, or  $-O(CH_2CH_2O)_nCH_3$  where  $n=1$  to 4, or  $R^1$  together with  $R^2$  represents  $-O(CH_2)_m-CH_2-$  or  $-O(CH_2)_m-O-$ , in which  $m$  is 1 to 12, 0 to 40% by weight of structural units derived from at least one monomer of the formula (II)



in which  $R^4$  and  $R^5$ , independently of one another, denote a hydrogen atom, a halogen atom, a  $C_1$ - $C_{12}$ -alkyl group or aryl or, together with the carbon atoms linking them, form an aromatic ring,  $R^3$  and  $R^6$ , independently of one another, denote a hydrogen atom, or  $R^3$  together with  $R^4$  and the carbon atoms linking them, or  $R^5$  together with  $R^6$  together with the carbon atoms linking them, in each case form an aromatic ring, X denotes an oxygen atom, a sulfur atom, an =NH group, an =N-alkyl group or an =N-aryl group, 0 to 40% by weight of structural units derived from at least one monomer of formula (III)



in which  $R^7$ ,  $R^8$ ,  $R^9$  and  $R^{10}$  independently of one another denote a hydrogen atom, a  $C_1$ - $C_{12}$  alkyl group, a  $C_1$ - $C_{12}$ -alkoxy group or an aryl group, Y and Z, independently of one another, denote an oxygen atom, a sulfur atom, an =NH group, an =N-alkyl group or an =N-aryl group,  $R^{11}$  denotes an arylene group, a heteroarylene group or a conjugated system of the formula  $-(CH=CH)-_0$ , in which 0 is zero, 1, 2 or 3, 0 to 40% by weight of structural units derived from at least one monomer of the formula (IV)



in which  $R^{12}$  and  $R^{13}$ , independently of one another, denote a hydrogen atom, a halogen atom, a  $C_1$ - $C_{12}$ -alkyl group, a  $C_1$ - $C_{12}$ -alkoxy group, a  $C_1$ - $C_4$ -alkylamino group or a  $C_1$ - $C_4$ -acylamino group,  $R^{14}$  denotes a halogen atom, a  $C_1$ - $C_{12}$ -alkyl group, a  $C_1$ - $C_{12}$ -alkoxy group, a  $C_1$ - $C_4$ -alkylamino group or a  $C_1$ - $C_4$ -acylamino group and X has the above-mentioned meaning, where the oligomer, in the oxidized form, is completely soluble in dipolar aprotic solvents at  $25^\circ\text{C}$ , and solutions having a content of at least 0.5 g of the oligomer in 100 ml of solvent are obtained at  $25^\circ\text{C}$ , and 0 to 90% by weight of a polymer which is dissolved or swollen in solvents or solvent mixtures having a  $\delta_p$  value greater than  $3.5 \text{ (cal/ccm)}^{1/2}$  and  $\delta_H$  value less than  $6.5 \text{ (cal/ccm)}^{1/2}$ .

Kämpf does not disclose preparation of poly(3,4-dioxyalkylenethiophene)s. The first disclosure of such polymers was in EP-A 339 340 which corresponds to U.S. Patent Nos. 4,959,430, 4,987,042 and 5,035,929. Further, while Kämpf purports to disclose solvent-soluble oligomers, poly(3,4-dioxyalkylenethiophene)s are insoluble and not swellable in solvent and solvent mixtures as disclosed in

Kämpf. Thus, even if these polymers were to be regarded as enabled by Kämpf, Kämpf would not be in possession of the invention. Applicants therefore submit that Kämpf does not disclose poly(3,4-dioxyalkylene-thiophene)s to one skilled in the art.

Accordingly, it is respectfully submitted that claims 4-5, 7-10 and 14 are not rendered obvious under 35 U.S.C. §103(a) over Escher in view of Kämpf. Withdrawal of the §103 rejection is requested.

As to the rejection of claims 11-12 under 35 U.S.C. §103(a) as being unpatentable over Escher in view of Kämpf as applied above and further in view of Eguchi, it is noted that Eguchi is relied on for teaching the additional features of an adhesion-improving anchor layer which has barrier properties to compounds which may diffuse from the substrate, and an electroconductive layer (electrode) made out of indium tin oxide. The primary reference to Escher is acknowledged by the Examiner to not teach these elements. Eguchi distinguishes between the presence of an alignment material and of a polymeric electroconductive compound in the alignment film. Further, Eguchi exemplifies polyimide liquid crystal alignment materials and polyaniline, polypyrrole and poly-2,5-thienylene vinylene polymeric electroconductive compounds.

It is submitted that Escher and Kämpf do not teach or suggest the claimed invention as set forth above. Further, since Eguchi is only relied on for teaching additional isolated limitations with respect to claims 11-12, applicants submit that Eguchi does not make up for the shortcomings of the primary combination of Escher and Kämpf.

Accordingly, it is submitted that the combination of Escher, Kämpf and Eguchi also does not render the claimed invention obvious within the meaning of §103. No teaching or suggestion is provided to modify the disclosures as asserted by the Examiner to provide the claimed invention. Withdrawal therefore of the §103 rejection is respectfully requested.

As to the rejection of claim 17 under 35 U.S.C. §103(a) as being unpatentable over Escher in view of Kämpf, applicants respectfully resubmit their response as set forth above with respect to the other §103 rejection based on Escher in combination with Kämpf. As noted by the Examiner, claim 17 includes the limitations of claim 8, except that claim 17 includes the additional limitation of being a "liquid crystal display" including such device.

Accordingly, it is respectfully submitted that claim 17 is not rendered obvious within in meaning of 35

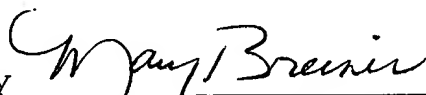
4907/USSN 09/689,632  
Group Art Unit 1772

U.S.C. §103(a) over Escher in view of Kämpf. Withdrawal of the §103 rejection is requested.

Reconsideration and allowance of the application is respectfully requested.

Respectfully submitted,

JEAN-PIERRE TAHON ET AL

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Attachment - Hackh's Chemical Dictionary, page 27